

PEMBAHASAN SOAL UJIAN KUIS I APLIKASI KOMPUTER III

MATERI : KALKULUS, DERET

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APLIKASI KOMPUTER III

Nama :

NIM :

Kelas :

No	SOAL	JAWABAN (1)
1	<p>Tentukan</p> <p>a) $\lim_{x \rightarrow \infty} \frac{3\sqrt{x^3 + 3x}}{\sqrt{2x^3}}$</p> <p>b) $\lim_{x \rightarrow -1} \frac{x^3 - 6x^2 + 11x - 6}{x^3 + 4x^2 - 19x + 14}$</p>	<pre>> restart;</pre> $\lim_{x \rightarrow \infty} \frac{3\sqrt{x^3 + 3x}}{\sqrt{2x^3}} = \frac{3}{2}\sqrt{2}$ <pre>> limit((3*sqrt(x^3)+3*x)/sqrt(2*x^3),x=infinity);</pre> $\lim_{x \rightarrow -1} \frac{x^3 - 6x^2 + 11x - 6}{x^3 + 4x^2 - 19x + 14} = -\frac{2}{3}$ <pre>> limit((x^3-6*x^2+11*x-6)/(x^3+4*x^2-19*x+14),x=-1);</pre>
2	<p>Gunakan aturan</p> $y' = \lim_{h \rightarrow 0} \frac{y(x+h) - y(x)}{h}, \text{ untuk}$ <p>menentukan $y'(x)$</p> <p>a) $y = (x^2 + 17)(x^3 - 3x + 1)$</p> <p>b) $y = \frac{1}{3x^2 + 1}$</p>	<pre>> y := x ->(x^2+17)*(x^3-3*x+1):</pre> <pre>> limit((y(x+h)-y(x))/h,h=0):</pre> $\frac{d}{dx} [(x^2 + 17)(x^3 - 3x + 1)] = 5x^4 + 42x^2 + 2x - 51$ <pre>> simplify(diff((x^2+17)*(x^3-3*x+1),x));</pre> <pre>> y := x ->1/(3*x^2+1):</pre> <pre>> limit((y(x+h)-y(x))/h,h=0):</pre> $\frac{d}{dx} \left(\frac{1}{3x^2 + 1} \right) = -\frac{6x}{(3x^2 + 1)^2}$ <pre>> simplify(diff(1/(3*x^2+1),x));</pre>

No	SOAL	JAWABAN (1)
3	Hitunglah a) $\int \frac{17x-3}{3x^2+x-2} dx$ b) $\int \frac{2x^2+x-4}{x^3-x^2-2x} dx$	$> \text{int}((17*x-3)/(3*x^2+x-2),x); \frac{5}{3} \ln(3x-2) + 4 \ln(x+1)$ $> \text{int}((2*x^2+x-4)/(x^3-x^2-2*x),x); \ln(x-2) + 2 \ln(x) - \ln(x+1)$
4	Hitunglah a) $\int_0^1 (x^3 - 3x^2 + 3\sqrt{x}) dx$ b) $\int_1^2 t^4 (t^5 + 5)^{\frac{2}{3}} dt$	$> \text{int}(x^3-3*x^2+3*\text{sqrt}(x),x=0..1); \frac{5}{4}$ $> \text{int}(t^4*(t^5+5)^{(2/3)},t=1..2); \int_1^2 t^4 (t^5 + 5)^{(2/3)} dt$
5	Tentukan nilai a. $\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \dots$ b. $\frac{1}{1.3} + \frac{1}{2.4} + \frac{1}{3.5} + \frac{1}{4.6} + \dots$	$> \text{sum}(1/((2*n-1)*(2*n+1)),n=1..infinity); \frac{1}{2}$ $> \text{sum}(1/(n*(n+2)),n=1..infinity); \frac{3}{4}$

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No	SOAL	JAWABAN (2)
1	Tentukan a) $\lim_{x \rightarrow \infty} \sqrt[3]{\frac{1+8x^2}{x^2+4}}$ b) $\lim_{x \rightarrow 2} \frac{x^2+7x+10}{x+2}$	<pre>> limit(((1+8*x^2)/(x^2+4))^(1/3),x=infinity); 8^(1/3) > limit((x^2+7*x+10)/(x+2),x=infinity); ∞</pre>
2	Gunakan aturan $y' = \lim_{h \rightarrow 0} \frac{y(x+h) - y(x)}{h}$, untuk menentukan $y'(x)$ a) $y = (x^4 + 2x)(x^3 + 2x + 1)$ b) $y = \frac{1}{4x^2 - 3x + 9}$	<pre>> y := x -> (x^4+2*x)*(x^3+2*x+1): > limit((y(x+h)-y(x))/h,h=0): > simplify(diff((x^4+2*x)*(x^3+2*x+1),x)); 2 + 8x + 12x^3 + 7x^6 + 10x^4 > y := x -> 1/(4*x^2-3*x+9); y := x -> 1/(4x^2 - 3x + 9) > limit((y(x+h)-y(x))/h,h=0): > simplify(diff(1/(4*x^2-3*x+9),x)); - (8x - 3) / (4x^2 - 3x + 9)^2</pre>

No	SOAL	JAWABAN (2)
3	Hitunglah a) $\int \frac{6x^2 + 22x - 23}{(2x-1)(x^2+x-6)} dx$ b) $\int \frac{x^3}{x^2+x-2} dx$	<pre>> restart;</pre> $\int \frac{6x^2 + 22x - 23}{(2x-1)(x^2+x-6)} dx = -\ln(x+3) + \ln(2x-1) + 3\ln(x-2)$ <pre>> int((6*x^2+22*x-23)/((2*x-1)*(x^2+x-6)),x);</pre> $\int \frac{x^3}{x^2+x-2} dx = \frac{1}{2}x^2 - x + \frac{8}{3}\ln(x+2) + \frac{1}{3}\ln(x-1)$ <pre>> int(x^3/(x^2+x-2),x);</pre>
4	Hitunglah a) $\int_1^4 \frac{s^4-8}{s^2} ds$ b) $\int_{-4}^{-2} \left(y^2 + \frac{1}{y^3} \right) dy$	<pre>> restart;</pre> $\int_1^4 \frac{s^4-8}{s^2} ds = 15$ <pre>> int((s^4-8)/s^2,s=1..4);</pre> $\int_{-4}^{-2} \left(y^2 + \frac{1}{y^3} \right) dy = 15$ <pre>> int(y^2+y^(-3),y=-4..2);</pre>
5	Tentukan nilai a. $\sum_{k=1}^{\infty} \left(\frac{1}{k} - \frac{1}{k+2} \right)$ b. $\sum_{k=1}^{\infty} \left(\frac{\sqrt{k+1} - \sqrt{k}}{\sqrt{k^2+k}} \right)$	<pre>> sum(1/k-1/(k+2),k=1..infinity);</pre> $\frac{3}{2}$ <pre>> sum((sqrt(k+1)-sqrt(k))/sqrt(k^2+k),k=1..infinity);</pre> $\sum_{k=1}^{\infty} \frac{\sqrt{k+1} - \sqrt{k}}{\sqrt{k^2+k}}$

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No	SOAL	JAWABAN (3)
1	Tentukan a) $\lim_{x \rightarrow \infty} \frac{2x+1}{\sqrt{x^2+3}}$ b) $\lim_{x \rightarrow 2} \frac{x^2-14x-51}{x^2-4x-21}$	<pre>> restart;</pre> 2 <pre>> limit((2*x+1)/sqrt(x^2+3),x=infinity);</pre> <pre>> limit((x^2-14*x-51)/(x^2-4*x-21),x=infinity);</pre> 1
2	Gunakan aturan $y' = \lim_{h \rightarrow 0} \frac{y(x+h) - y(x)}{h}$, untuk menentukan $y'(x)$ a) $y = (5x^2 - 7)(3x^2 - 2x + 1)$ b) $y = \frac{x-1}{x+1}$	<pre>> restart;</pre> $60x^3 + 14 - 30x^2 - 32x$ <pre>> y := x ->(5*x^2-7)*(3*x^2-2*x+1):</pre> <pre>> limit((y(x+h)-y(x))/h,h=0):</pre> <pre>> simplify(diff((5*x^2-7)*(3*x^2-2*x+1),x));</pre> <pre>> restart;</pre> $-\frac{2}{(x-1)^2}$ <pre>> y := x ->1/(x-1)*(x+1):</pre> <pre>> limit((y(x+h)-y(x))/h,h=0):</pre> <pre>> simplify(diff(1/(x-1)*(x+1),x));</pre>

No	SOAL	JAWABAN (3)
3	<p>Hitunglah</p> <p>a) $\int \frac{x^4 + 8x^2 + 8}{x^3 + 3x^2 + 3x + 1} dx$</p> <p>b) $\int \frac{2x^2 + x - 8}{x^3 + 4x} dx$</p>	<pre>> restart;</pre> <pre>> int((x^4+8*x^2+8)/((x^3+3*x^2+3*x+1)),x);</pre> $\frac{1}{2}x^2 - 3x - \frac{17}{2} \frac{1}{(x+1)^2} + 14 \ln(x+1) + \frac{20}{x+1}$ <pre>> int((2*x^2+x-8)/(x^3+4*x),x);</pre> $2 \ln(x^2 + 4) + \frac{1}{2} \arctan\left(\frac{1}{2}x\right) - 2 \ln(x)$
4	<p>Hitunglah</p> <p>a) $\int_0^4 [\sqrt{x} + \sqrt{2x+1}] dx$</p> <p>b) $\int_a^{8a} (a^{1/3} - x^{1/3})^3 dx$</p>	<pre>> restart;</pre> <pre>> int(sqrt(x)+sqrt(2*x+1),x=0..4);</pre> $\frac{1}{4}$ <pre>> int((a^(1/3)-x^(1/3))^3,x=a..8*a);</pre> $-\frac{49}{20}a^2$
5	<p>Diketahui :</p> <p>$A=1^{-4} + 2^{-4} + 3^{-4} + \dots$</p> <p>$B=1^{-4} + 3^{-4} + 5^{-4} + \dots$</p> <p>Tentukan nilai $\frac{A}{B}$</p>	<pre>> restart;</pre> <pre>> A:=sum(n^(-4),n=1..infinity);</pre> $A := \frac{1}{90} \pi^4$ <pre>> B:=sum(2*n-1,n=1..infinity);</pre> $B := \infty$ <pre>> A/B; 0</pre>

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No	SOAL	JAWABAN (4)
1	<p>Tentukan</p> <p>a) $\lim_{x \rightarrow \infty} \sqrt[3]{\frac{\pi x^3 + 3x}{\sqrt{2x^3 + 7x}}}$</p> <p>b) $\lim_{x \rightarrow 1} \frac{x^2 + ux - x - u}{x^2 + 2x - 3}$</p>	<pre>> restart;</pre> <pre>> limit(((Pi*x^3+3*x)/(sqrt(2)*x^3+7*x))^(1/3),x=infinity);</pre> $\frac{1}{2} 2^{(2/3)} (\pi \sqrt{2})^{(1/3)}$ <pre>> limit((x^2+u*x-x-u)/(x^2+2*x-3),x=1);</pre> $\frac{1}{4} + \frac{1}{4} u$
2	<p>Gunakan aturan</p> <p>$y' = \lim_{h \rightarrow 0} \frac{y(x+h) - y(x)}{h}$, untuk menentukan $y'(x)$</p> <p>a) $y = (3x^2 + 2x)(x^4 - 3x + 1)$</p> <p>b) $y = \frac{2x^2 - 1}{3x + 5}$</p>	<pre>> restart;</pre> <pre>> y := x -> (3*x^2+2*x)*(x^4-3*x+1):</pre> <pre>> limit((y(x+h)-y(x))/h,h=0):</pre> <pre>> simplify(diff((3*x^2+2*x)*(x^4-3*x+1),x));</pre> $2 - 6x - 27x^2 + 10x^4 + 18x^5$ <pre>> y := x -> (2*x^2-1)/(3*x+5):</pre> <pre>> limit((y(x+h)-y(x))/h,h=0):</pre> <pre>> simplify(diff((2*x^2-1)/(3*x+5),x));</pre> $\frac{6x^2 + 20x + 3}{(3x + 5)^2}$
3	<p>Hitunglah</p> <p>a) $\int \frac{3x^2 - 21x + 32}{x^3 - 8x^2 + 16x} dx$</p> <p>b) $\int \frac{2x^2 + x - 8}{x^3 + 4x} dx$</p>	<pre>> restart;</pre> <pre>> int((3*x^2-21*x+32)/(x^3-8*x^2+16*x),x);</pre> $\frac{1}{x - 4} + \ln(x - 4) + 2 \ln(x)$

No	SOAL	JAWABAN (4)
		$> \text{int}((2*x^2+x-8)/(x^3+4*x),x); \quad 2 \ln(x^2 + 4) + \frac{1}{2} \arctan\left(\frac{1}{2} x\right) - 2 \ln(x)$
4	<p>Hitunglah</p> <p>a) $\int_1^4 \frac{s^4 - 8}{s^2} ds$</p> <p>b) $\int_a^{8a} (a^{1/3} - x^{1/3})^3 dx$</p>	<pre>> restart;</pre> <pre>> int((s^4-8)/(s^2),s=1..4);</pre> 1 5 <pre>> int((a^(1/3)-x^(1/3))^3,x=a..8*a);</pre> $-\frac{49}{20} a^2$
5	<p>Tentukan nilai</p> <p>a) $1.3 + 3.3^2 + 5.3^3 + \dots$</p> <p>b) $2.5^2 + 5.5^3 + 8.5^4 + \dots$</p>	<pre>> restart;</pre> <pre>> sum((2*n-1)*(2*n+1)^n,n=1..infinity);</pre> $\sum_{n=1}^{\infty} (2n-1)(2n+1)^n$ <pre>> sum((3*n+1)*5^(n+1),n=1..infinity);</pre> ∞

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No	SOAL	JAWABAN (5)
1	<p>Tentukan</p> <p>a) $\lim_{x \rightarrow \infty} \sqrt{\frac{x^2 + x + 3}{(x-1)(x+1)}}$</p> <p>b) $\lim_{w \rightarrow -2} \frac{(w+2)(w^2 - w - 6)}{w^2 + 4w + 4}$</p>	<pre>> restart;</pre> <pre>> limit((x^2+x+3)/((x-1)*(x+1)),x=infinity);</pre> <p style="text-align: center;">1</p> <pre>> limit((w+2)*(w^2-w-6)/(w^2+4*w+4),w=-2);</pre> <p style="text-align: center;">-</p> <p style="text-align: center;">5</p>
2	<p>Gunakan aturan</p> <p>$y' = \lim_{h \rightarrow 0} \frac{y(x+h) - y(x)}{h}$, untuk menentukan $y'(x)$</p> <p>a) $y = (-3x+2)^2$</p> <p>b) $y = \frac{x^2 - x + 1}{x^2 + 1}$</p>	<pre>> restart;</pre> <pre>> y := x -> (-3*x+2)^2;</pre> <pre>> limit((y(x+h)-y(x))/h,h=0):</pre> <pre>> simplify(diff((-3*x+2)^2,x));</pre> <p style="text-align: center;">$18x - 12$</p> <pre>> y := x -> (x^2-x+1)/(x^2+1):</pre> <pre>> limit((y(x+h)-y(x))/h,h=0):</pre> <pre>> simplify(diff((x^2-x+1)/(x^2+1),x));</pre> <p style="text-align: center;">$\frac{x^2 - 1}{(x^2 + 1)^2}$</p>

No	SOAL	JAWABAN (5)
3	<p>Hitunglah</p> <p>a) $\int \frac{2x^2 - 3x - 36}{(2x-1)(x^2+9)} dx$</p> <p>b) $\int \frac{1}{(x-1)^2(x^2-4x+5)} dx$</p>	<pre>> restart;</pre> <pre>> int((2*x^2-3*x-36)/((2*x-1)*(x^2+9)),x);</pre> $\frac{3}{2} \ln(x^2 + 9) - 2 \ln(2x - 1)$ <pre>> int(1/((x-1)^2*(x^2-4*x+5)),x);</pre> $-\frac{1}{4} \ln(x^2 - 4x + 5) + \frac{1}{2} \ln(x - 1) - \frac{1}{2} \frac{1}{x - 1}$
4	<p>Hitunglah</p> <p>a) $\int_0^1 (x^3 - 3x^2 + 3\sqrt{x}) dx$</p> <p>b) $\int_0^4 \frac{1}{\sqrt{9+t^2}} dt$</p>	<pre>> restart;</pre> <pre>> int((x^3-3*x^2+3*sqrt(x)),x=0..1);</pre> $\frac{5}{4}$ <pre>> int((1/sqrt(9+t^2)),t=0..4);</pre> $\frac{1}{2} \frac{-(-6 \ln(2) + 2 \ln(3)) \sqrt{\pi} + 2 \sqrt{\pi} \ln\left(\frac{9}{8}\right)}{\sqrt{\pi}}$
5	<p>Tentukan nilai</p> <p>a) $\frac{1}{2} + \frac{3}{4} + \frac{5}{8} + \dots$</p> <p>b) $1.3 + 3.5 + 5.7 + \dots$</p>	<pre>> restart;</pre> <pre>> sum((2*n-1)/(2*n),n=1..infinity);</pre> ∞ <pre>> sum((2*n-1)*(2*n+1),n=1..infinity);</pre> ∞